JMASS/JPSD
FOM Translation Experiment
Lessons Learned

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for
Air Force Wright Laboratory (WL/AASE)
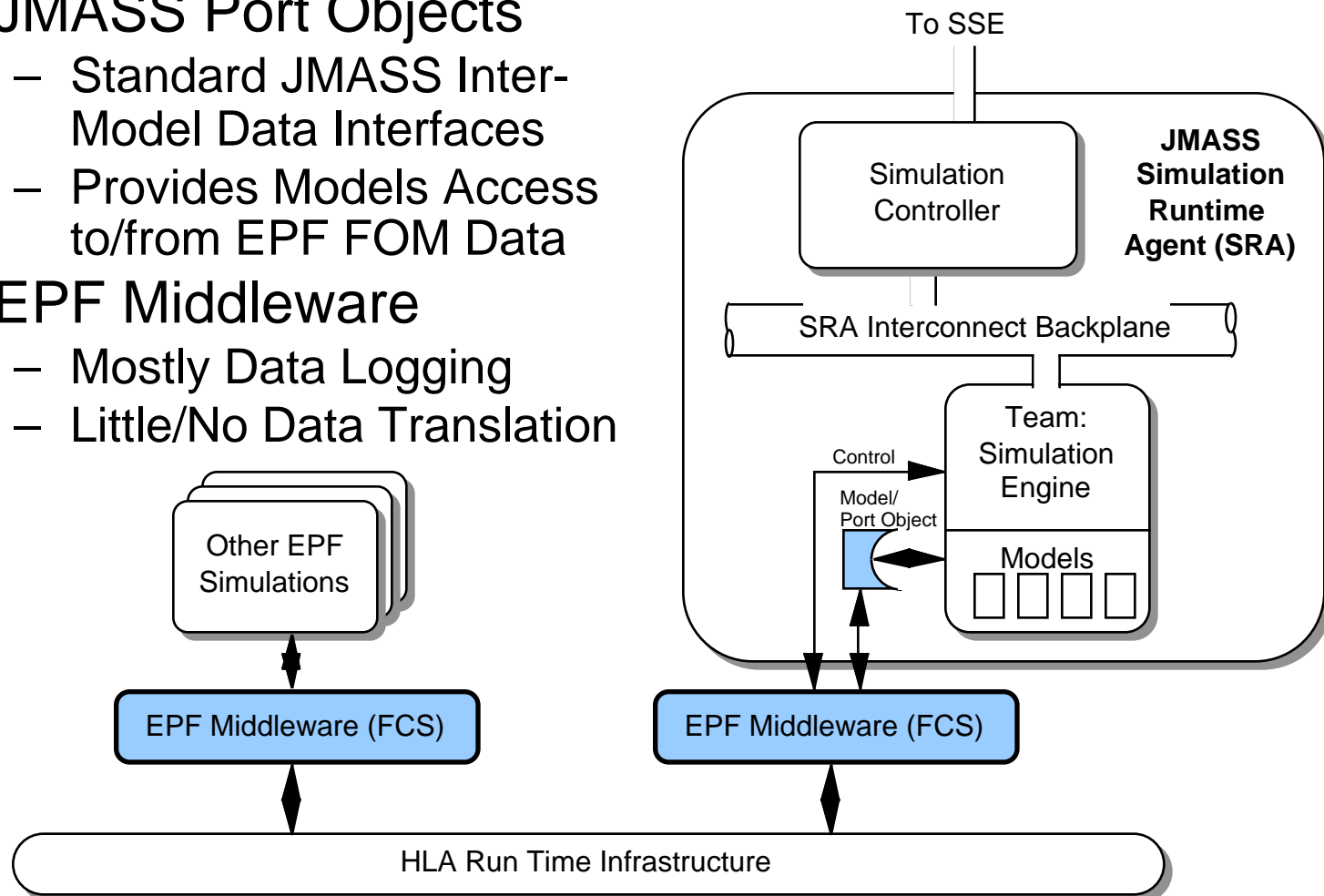
FOM #1 - EPF FOM
(Excerpt)

Class Structure			
Airplane	Strike	Multiple Types	
	Fighter	Multiple Types	
	"E"	Single Entity	
	AEW	Multiple Types	
Boat	Carrier	Single Entity	
	Cruiser	Single Entity	
	Fishing	Single Entity	
Land Site	Airfield	Multiple Entities	
	Radar Site	Multiple Entities	
	Command Post	Single Type	
	TELAR	Mult. Types	
	Shore Battery	Single Entity	
	AAA Battery	Single Type	
Missile	SAM	Point Defense	Multiple Types (Blue & Red)
		Long Range Intercept	Single Type
	SSM	Single Entity	
	AAM	Multiple Types	

- ## Hierarchically-Based Entities
- ## Attribute Detail in EPF ICD Document
  - ### Attributes Defined for Each Leaf Node
- ## Largely DIS Entity Based, Reduced Complexity

JMASS Model Interface to EPF FOM

- **JMASS Port Objects**
  - Standard JMASS Inter-Model Data Interfaces
  - Provides Models Access to/from EPF FOM Data
- **EPF Middleware**
  - Mostly Data Logging
  - Little/No Data Translation

To SSE

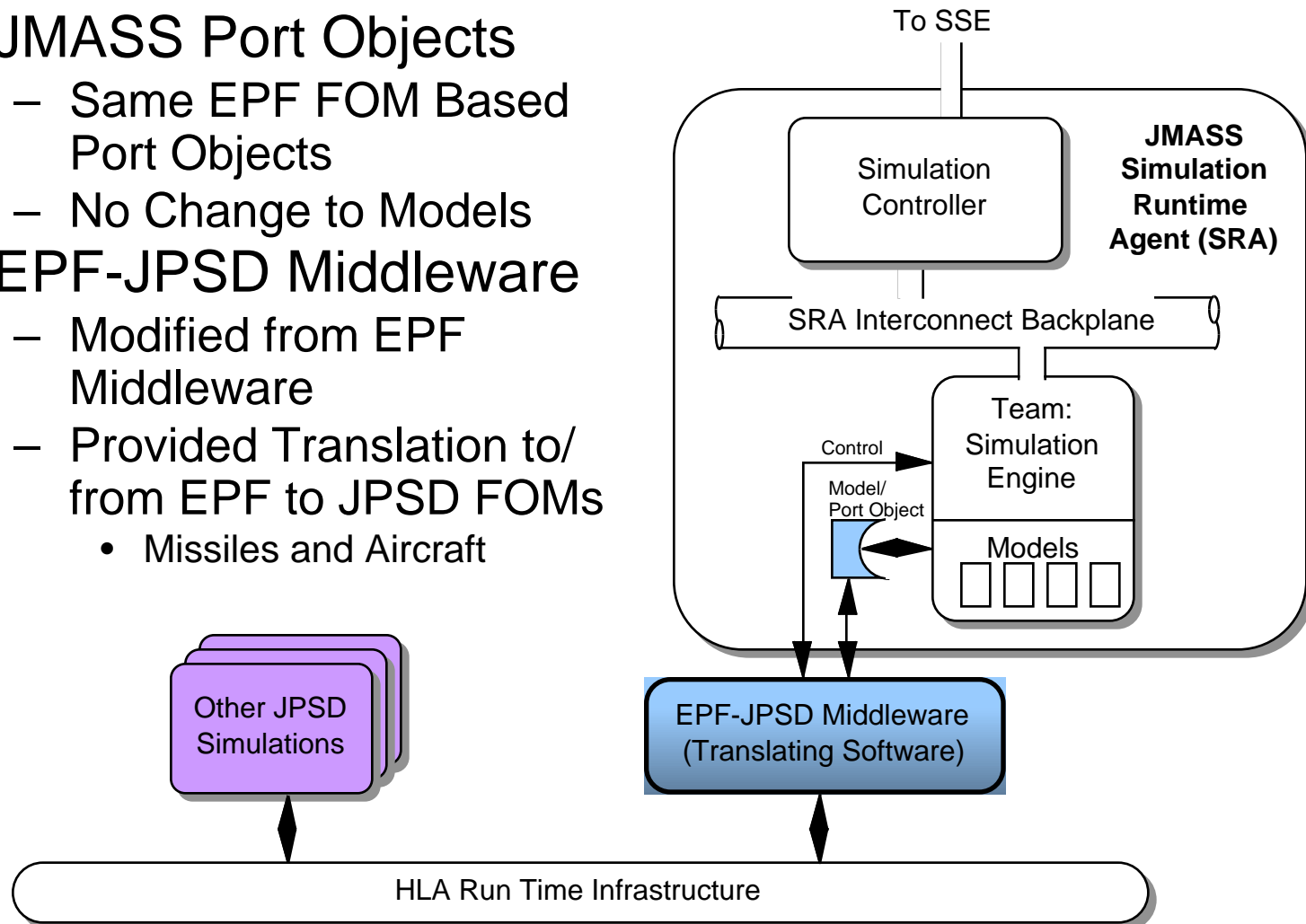**JMASS Simulation Runtime Agent (SRA)**

Simulation Controller

SRA Interconnect Backplane

Team: Simulation Engine

Control

Model/ Port Object

Models

Other EPF Simulations

EPF Middleware (FCS)

EPF Middleware (FCS)

HLA Run Time Infrastructure

FOM #2 - JPSD FOM
(Excerpt)

Entity	Platform		Land	Tank	M1 (PS)
					T72 (PS)
					T54 (PS)
				ArmoredFightingVehicle	BMP-1 (PS)
					BTR80 (PS)
				SelfPropelledArtillery	M270_ATACMS (PS)
					M109 (PS)
				SmallWheeledUtilityVehicle	M577A1 (PS)
			Air	AttackHelicopter	AH64 (PS)
					RAH66 (PS)
				ElectronicWarfare	JSTARS (PS)
				UAV	HUNTER_2GEN (PS)
	Munition		AntiArmor	Guided	BAT_P3I (PS)
			BattlefieldSupport	ATACMS_MISSILE (PS)	

- ## Hierarchically-Based Entities
  - – Different Level Hierarchy from EPF FOM
- ## Detail in Attribute / Parameter Tables
  - – Defined Across/Down the Hierarchy
- ## Largely DIS Entity Based, Full PDU Complexity

Supporting the JPSD FOM w/ JMASS EPF Models

- **JMASS Port Objects**
  - Same EPF FOM Based Port Objects
  - No Change to Models
- **EPF-JPSD Middleware**
  - Modified from EPF Middleware
  - Provided Translation to/ from EPF to JPSD FOMs
    - Missiles and Aircraft

To SSE

JMASS Simulation Runtime Agent (SRA)

Simulation Controller

SRA Interconnect Backplane

Control

Model/ Port Object

Team: Simulation Engine

Models

Other JPSD Simulations

EPF-JPSD Middleware (Translating Software)
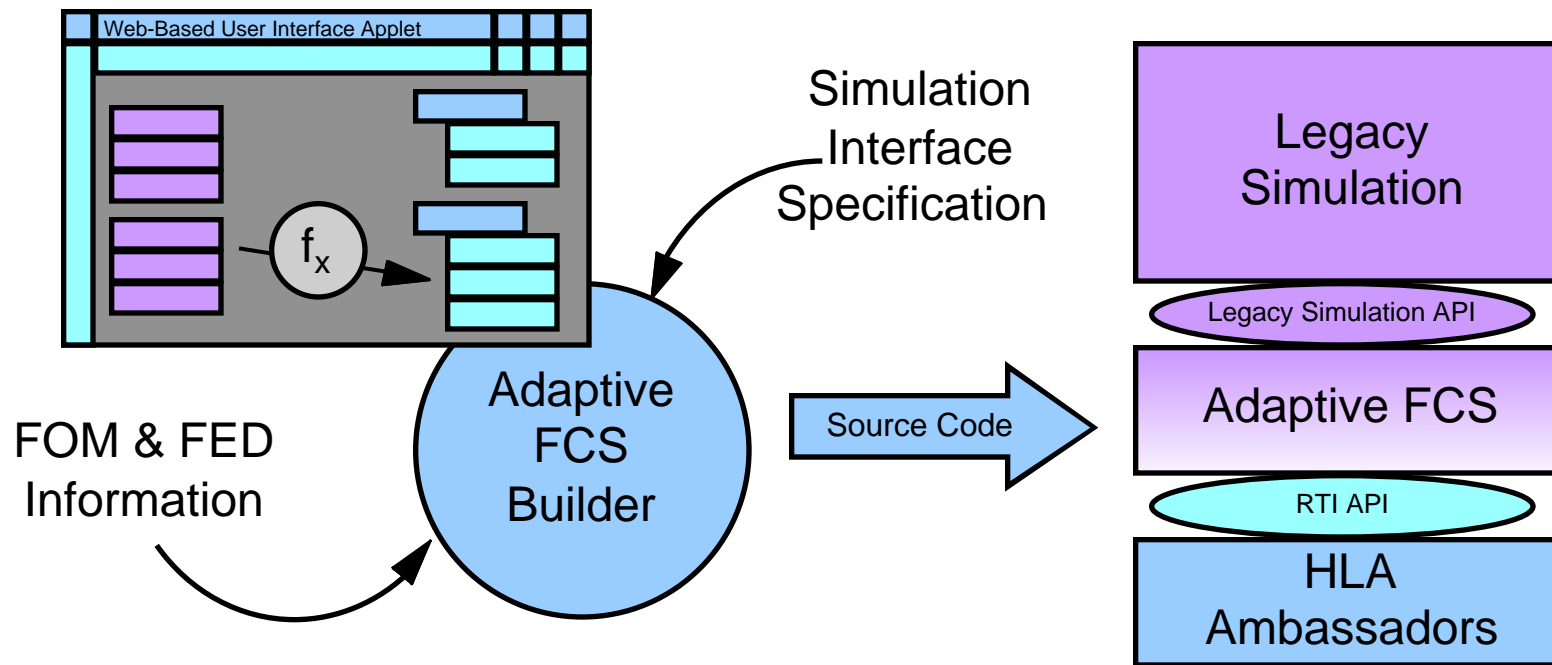
HLA Run Time Infrastructure

JPSD-JMASS Experiment
Lessons Learned

- JPSD and EPF FOMs Are Largely Very Similar
  - Both Based on DIS, Platform-Oriented
  - Typical DIS Entity State-Like Data at Leaf Nodes
- When FOMs are Largely Similar, Problem is Straightforward
  - Position, etc. Like Data Require "Simple" Translations
  - Most Entities are Logically Simple to Map Together
  - Basically a Well Known Engineering or Computer Science Problem

Conjecture

- Most Federates to be Integrated are Largely Similar
- Vastly Unsimilar Federates Invoke Broader Issues
  - Domain Mismatch
  - Different Level of Simulation (LRU v. Platform v. Air Wing)

Adaptive Federation Common Software Concept

Web-Based User Interface Applet

f_x

Simulation Interface Specification

FOM & FED Information

Adaptive FCS Builder

Source Code

Legacy Simulation

Legacy Simulation API

Adaptive FCS

RTI API

HLA Ambassadors

- ◆ User Identifies Transform from Legacy Data to WL FOM Requirements
- ◆ Builder Creates FCS Software from Knowledge of Simulation and User's Transforms
- ◆ FCS Compiled and Linked w/ Ambassadors to Form Integrated Simulation